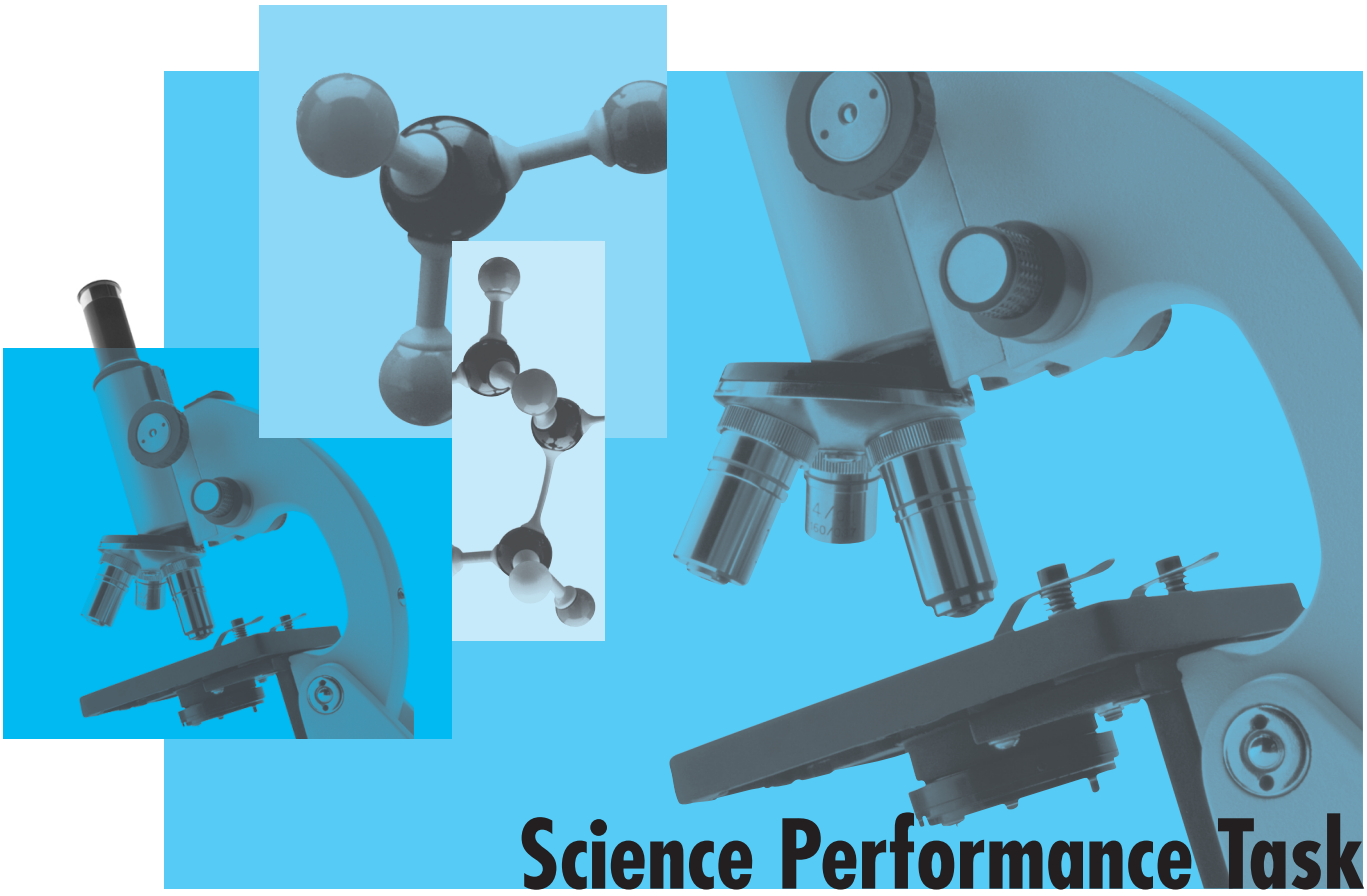
2002 CAPT

Connecticut Academic Performance Test Second Generation

Connecticut State Board of Education



Science Performance Task

Cold Packs

STUDENT NAME: TEACHER/EXAMINER:

SCHOOL NAME: GRADE:

Harcourt Educational Measurement
A Harcourt Assessment Company

999-8304-11-3

Cold Packs

Certain chemicals when dissolved in water give off heat, while others become cold. These chemicals can be used in hot or cold packs. Cold packs can be used to reduce swelling from a bruise or injury.

A company is trying to develop a new cold pack. The cold pack will contain one chemical mixed with 50 mL of water. The company would like your help in determining which of the following chemicals is best for use in a cold pack and how much should be used.

Ammonium chloride (NH_4Cl)
Calcium chloride ($CaCl_2$)
Sodium chloride (NaCl)

Your Task

Part I: You and your partner will design and conduct an experiment to determine which of the three chemicals is best for use in a cold pack.

Part II: You and your partner will design and conduct an experiment to determine if the amount of the best chemical from Part I affects its use in the cold pack.

During this activity you will work with a partner (or possibly two partners). However, you must keep your own individual lab notes because after you finish you will work independently to write a report about your investigation.

You have been provided with the following materials and equipment. It may not be necessary to use all of the equipment that has been provided. You may use additional materials and equipment if they are available.

Note: You have been given 1 scoopful of each chemical. Use this amount for Part I and Part II.

1 scoopful ammonium chloride (NH_4Cl)	**3 teaspoons**
1 scoopful calcium chloride ($CaCl_2$)	**3 stirrers**
1 scoopful sodium chloride (NaCl)	**1 graduated cylinder**
10 small plastic cups	**1 thermometer**
Access to water	**Labeling dots**
Access to a balance	**1 pair of vinyl gloves**
Access to a watch or clock with a second hand	**Paper towels for cleanup**
Splash-proof safety goggles and apron for each student	

Steps to Follow

1. **In your own words, clearly state the problems you are going to investigate for both Part I and Part II.** Include a clear identification of the independent and dependent variables that will be studied. Write a statement of the problems on pages 4 and 5.

2. **Design a separate experiment to solve each problem.** Use the amount of chemical you have been given for both Part I and Part II. Your experimental design should match the statement of the problem, should control for variables, and should be clearly described so that someone else could easily replicate your experiment. Include a control if appropriate.

   Caution: Do not mix the chemicals together.

   Write your experimental designs on pages 4 and 5. Show your designs to your teacher before you begin your experiments.

3. **After receiving approval from your teacher, work with your partner to carry out your experiments.** Your teacher's approval does not necessarily mean that your teacher thinks your experiments are well designed. It simply means that in your teacher's judgement your experiments are not dangerous or likely to cause an unnecessary mess.

4. **While conducting your experiments, take notes on the attached pages.** Include the results of your experiments. All data should be organized in tables, charts and graphs, which should be properly labeled. Space for your data has been provided on page 9.

   Your notes will not be scored, but they will be helpful to you later as you work independently to write about your experiments and results. You must keep your own notes because you will not work with your partner when you write your lab report.

   When you have finished your experiments, your teacher will give you instructions for clean up procedures, including proper disposal of all materials.

Laboratory Notes

Your Statement of the Problem: Part I

Your Experimental Design: Part I

Laboratory Notes

Your Statement of the Problem: Part II

Your Experimental Design: Part II